



Chemical Protective Clothing for Terrorism Response

Continuing Challenge - 2000

Where Might An Event Occur?

- Public assemblies (sports events, political meetings)
- Mass transportation facilities (train, bus, car, airplane)
- Government buildings
- Large office complexes
- Telecommunications facilities
- Historic/Symbolic facilities

Scenarios

- Venue
- Obvious vs. Stealth Release
- Dispatch vs. On-scene Recognition
- Anticipated vs. Unexpected Weapon
- Agent Type and Combination

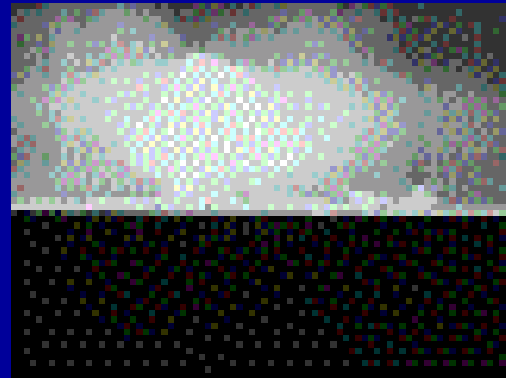
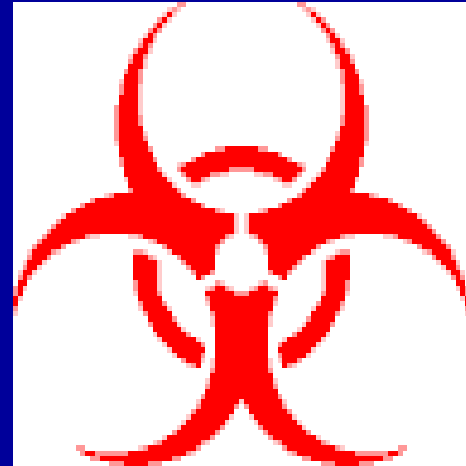
The 1st Responders

- Police, Fire or EMS Single Units
- Victims
- Hospitals
- Follow-on Fire, EMS, Police Response
- Mutual Aid Municipalities
- Follow-on assets - state, federal

Protective Clothing Purpose

- Protect the Responders & Care-givers
 - resource preservations
- Protect the Victims
 - exposure
- Protect the Public
 - secondary contamination

Terrorism Threats



Continuing Challenge - 2000

Terrorism Threats - FBI Analysis

- Explosives, Incendiaries, Firearms
- Biological Toxins
- Industrial Chemicals
- Biological Pathogens
- Radioisotopes
- Chemical Weapons
- Nuclear Weapons

Industrial Chemicals of Concern

- Ammonia
- Arsine
- Boron Trichloride
- Boron Trifluoride
- Carbon Disulfide
- Chlorine
- Diborane
- Ethylene Oxide
- Fluorine
- Formaldehyde
- Hydrochloric acid
- Hydrogen Bromide
- Hydrogen Chloride
- Hydrogen Cyanide
- Hydrogen Fluoride
- Hydrogen Sulfide
- Fuming Nitric Acid
- Phosgene
- Phosphorus Trichloride
- Sulfur Dioxide
- Sulfuric Acid
- Tungsten Hexafluoride

Chemical Warfare Agents

- From open literature
- At least 58 identified chemical weapons
- 20 Nerve Agents
- 8 Blister Agents
- Assorted acute poisons

Explosives, Firearms & Incendiaries

Protective Clothing Needs

- **First Responders**

- Body armor
- Fragmentation Suits
- Flame-resistant clothing
- Blood-borne pathogens protection



Chemical/Biological Exposures

	<u>Aerosol</u>	<u>Liquid</u>	<u>Vapor</u>
Biological Toxins	*	*	
Industrial Chemicals	*	*	*
Biological Pathogens	*	*	
Radioisotopes	*	*	
Chemical Weapons	*	*	*

Level A

Required when the highest potential for exposure to hazards exists and the highest level of skin, respiratory, and eye protection is called for.



Why Not Only Level A?

- SCBA Refill Logistics
- Heat Stress
- Respirator Fit Testing
- Annual training and Medical Exams
- HAZWOPER Training
- Reduced Risk Outside “Hot Zone”

Level B

Required under circumstances that call for the **highest level of respiratory protection** (same as Level A), but a **lesser level of skin protection**.



**Non-
Encapsulating**



Encapsulating

Level C

Required under circumstances that call for **skin protection** same as level B, but **lesser levels of respiratory protection**



Level D

Provides **lower**
level of skin
protection and **no**
respiratory
protection



Tasks versus Clothing

- Recon / Agent Identification
Level A/B
- Victim Recovery
Level A/B/C
- Victim Decontamination & Triage
Level B/C
- Victim Modesty
Level D

Tasks versus Clothing

- Hospitals
Decon / Isolation - Levels B/C
- Release Mitigation
Level A/B/C
- Mortuary
Level C/D
- Perimeter Control / Containment
Level C/D

Other Basic PPE Components

- Gloves
- Boots
- Head Protection
- Respirators

SCBA, NPR, PAPR

Annual Fit, Training, Medical Checks

Greatest Needs

- Level C Protection
 - Liquid-proof garments
 - Gloves and boots
 - Canister Respirators (Full-face or PAPR)
- Victim Modesty Garments
- Hospital Preparation

Special Operations Clothing

- SWAT Teams
- Structural Collapse / Extraction
- Bomb Disposal

Chem/Bio Clothing Standards

- Milspec MOPP Standards
 - military chem / bio suits
- NFPA 1991 - Chem/Bio Option
 - vapor-protective ensembles
 - additional chemical testing
- NFPA 1994 (in final review)
 - 3 Levels of protection
 - Vapor, Vapor/Liquid, Liquid

Before an Incident

- Response Plan
- Funding
- Staffing
- Equipment
- Training & Intelligence
- Unified Incident Command
 - public/private - local, state, federal

Summary

- Adequate Protective Clothing Exists
 - for most likely threats
 - low probability, special situations exist
- Response doctrine not complete
- Not all responders ready, trained or equipped